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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

VJAYAKUMAR, KALLAMBELLA M

ART UNIT	PAPER NUMBER
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1751

DATE MAILED: 04/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/082,965

Applicant(s)

IMAI ET AL.

Examiner

Kallambella Vijayakumar

Art Unit

1751

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11 and 12 is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Detailed Action

- Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.
- The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A (1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the examiner on form PTO-892 has cited the references, they have not been considered.
- The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. Claim 3 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in

the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

- Claim 3 rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for totally replaced 'B' element in the composition, does not reasonably provide enablement for partially replaced 'A' element in the composition. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to practice the invention commensurate in scope with these claims.
- Claim 3 rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure, which is not enabling. "Partially replaced A" critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

- Claim 3 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "partially" in claim 3 is a relative term which renders the claim indefinite. The term "partially" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably appraised of the scope of the invention. The public will not be appeased about

boundaries of this limitation and will not be able to practice the invention without undue burden of experimentation.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1-2, 4-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Allan et al (Phys. Rev-B. 1998, 57(9) pp 5106-5109 in view of de Boer et al (Phy. Rev.B. 1984, 29(12), pp 6797-6809.

Alan et al disclose the composition, structure and thermoelectric properties of TiS_2 , wherein TiS_2 has a layered structure with a trigonal space group of $P3m1$ formed from infinite sheets of face-sharing TiS_6 octahedral and hexagonal close-packed arrangement for sulfurs, and intercalation of lithium in TiS_2 , that would meet the limitations of instant claims (1-2, 4-8) (Alan: Page 5106, Col-1, Para 2-3; Col-2, Line-4, Para-3 to Page-5107, Col-1, Para-1, Table-1, Fig-1). The disclosure meets the limitation

of the composition of the chalcogenide when $x=0$, and CdI_2 type layered structure as shown by the space group and the disclosure by de Boer et al. (de Boer: Page-6798, Section-Crystal Structure, Fig-1-2). The measurement of thermoelectrical properties involves two thermoelectrical components being in contact as shown by de Boer et al and meets the limitation of a thermoelectric generator in instant claims 9-10 (de Boer: Page-6798, Col-1, Para-3; Page-6806, Section-VI). All the limitations of the instant claims are met.

The reference is anticipatory.

2. Claims 1-8 are rejected under 35 U.S.C. 102(e) as being anticipated by Teranishi et al (US Patent 6,376,127) in view of de Boer et al (Phy. Rev.B. 1984, 29(12), pp 6797-6809.

Teranishi disclose a composition of complex sulfide with the composition $\text{M}_x\text{Ti}_{1-x}\text{S}_y$, either with or without the addition of Li, wherein M is at least one selected from Cu, Zn, Cr, Mn, Co and Ni, x satisfies the relationship $0 < x \leq 0.18$, and y satisfies the relationship $1.65 \leq y \leq 2.25$ (Abstract) that would meet the limitations of the composition and ranges in the above listed instant claims. Teranishi et al further disclose these complex sulfides to have layered structure similar to that of TiS_2 that has CdI_2 type layered structure per instant claims (1, 5, 7) as shown by de Boer et al under Rejection-1 (US-127, Abstract, Col-1, Line-40 to Col-2, Line-15; Col-5, Table-1). All the limitations of the instant claims are met.

The reference is anticipatory.

3. Claims 1-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Di Salvo, Jr et al (US Patent 4,125,687).

Di Salvo et al disclose compositions with the formula $M_xN_{1-x}S_2$ wherein M-Mn, Fe, Ni or Co, N-V or Cr, and $x=0-0.5$ when $N=V$. Di Salvo et al further disclose these complex sulfides to have layered structure similar to that of TiS_2 , that can intercalate Li forming the composition of Li_xTiS_2 (Claims-1,3-4, 7-8) that is isostructural with TiS_2 (Claims 1-2, 4-8) which has layered structure similar to that of CdI_2 , further a composition of $Li_yFe_xV_{1-x}S_2$ (Claims-1, 3, 7) that would meet the limitations of the instant claims (Abstract; Col-1, Lines: 40-54; Fig-2, Col-4, Line: 40). All the limitations of the instant claims are met.

The reference is anticipatory.

Allowable Subject Matter

- Claims 11-12 allowed over prior art record.

Prior art of record neither teaches nor fairly suggestive of a thermoelectric refrigerator meeting the limitations of the instant claims by the applicants.

Conclusion

- The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Nazri (US Patent 4,826,743), Whittingham et al (US Patent 4,009,052 and 4,040,917), Teer et al (US patent 6,423,419), Kozmik et al (US patent 5,368,957), Anonymous (RD 236028) and Amara et al (Phy. Rev-B. 1987, 36(12), pp 6415-6419.
- Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kallambella Vijayakumar whose telephone number is 571-272-1324. The examiner can normally be reached on M-Th, 07.00 - 16.30 hrs, Alt. Fri: 07.00-15.30 hrs.
- If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Yogendra Gupta can be reached on 571-272-1316. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.
- Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kmv
March 20, 2004


Mark Kopec
Primary Examiner